

# Nicholas Marks

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## EDUCATION

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**Northwestern University**, Evanston, IL

B.S. Mechanical Engineering – Aerospace Concentration, Minor in Spanish

June 2022

GPA: 3.25/4.00

## TECHNICAL SKILLS

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**Computer:** SolidWorks, Siemens NX, Python, MATLAB, C/C++, git, LaTeX, Autodesk Eagle, Microsoft Office

**Manufacturing:** Filament winder, carbon fiber manufacturing, manual mill, CNC mill, 3D printing, water jet

**Language:** Proficient in Spanish, Spanish/English Seal of Biliteracy

**Certifications:** Level 1 High Power Rocketry Certification (NAR)

## INTERNSHIP EXPERIENCE

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**Mechanical Engineering Intern – Applied Thin Films Inc. Summer 2021 (full-time) – current (part-time)**

- Designed, prototyped, and tested a CNC machine for automating the infiltration process of ceramic matrix composite layups
- Wrote a G-code generator and interpreter from scratch in Python to produce and simulate rolling patterns for the aforementioned automated composite layup system
- Programmed/operated a CNC water jet for cutting ceramic matrix composite panels

## ROCKETRY TEAM

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**Chief Engineer – NUSTARS NASA Student Launch Team, Sept 2021 – current**

- Leading and overseeing all technical aspects of the project including the design and construction of the launch vehicle, payload, electronics, and recovery systems
- Holding training workshops to teach new members about rocketry including composites manufacturing, CAD, 3D printing, electronics design, and flight simulation

**Launch Vehicle Team Lead – NUSTARS NASA Student Launch Team, Sept 2020 – May 2021**

- Introduced in-house carbon fiber manufacturing for use in constructing rocket airframes, fins, and nose cones with a combination of filament winding, vacuum bagging, and hand-layup techniques
- Led the design and production of the club's first ever 100% in-house built launch vehicle including, material selection, flight simulation, manufacturing, and assembly

**Independent Study: Reaction wheel for rocket roll control, Fall 2020**

- Designed, built, and tested a reaction wheel for autonomously controlling a rocket about its roll axis

## RESEARCH EXPERIENCE

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**X-Ray Optics Researcher - Northwestern University CIERA, Prof. Melville Ulmer's Group (Summer 2019-20)**

- Developing adaptive optics technology for use in creating deformable X-ray telescope mirrors using Terfenol-D, a shape memory alloy
- Integrated a custom computer-controlled relay with MATLAB control software to switch between AC and DC power supplies remotely

### **Publications**

Melville P. Ulmer, Mohammadreza Jalilvand, **Nicholas A. Marks** et al., "The prospects for applying magnetic smart materials combined with shape memory alloys to produce correctable and deployable space telescopes", <https://doi.org/10.1117/12.2564726>